

EINHORN (M.)

On Functional Disorders of the
Stomach Accompanied with
Hypersecretion

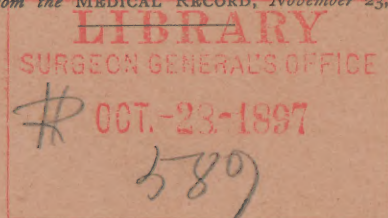
1. HYPERCHLORHYDRIA
2. GASTRO-SUCCORRHŒA CONTINUA PERIODICA
3. GASTRO-SUCCORRHŒA CONTINUA CHRONICA

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ON FUNCTIONAL DISORDERS OF THE STOMACH ACCOMPANIED WITH HYPER- SECRETION.¹

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By MAX EINHORN, M.D.,

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1. **Hyperchlorhydria.** — By the term "Hyperchlorhydria" ("Hyperacidity," "Hypersecretion") is designated a condition in which the stomach secretes a juice that is more acid than normally and richer in the ferments. While the quantity of the juice is very often likewise increased, its secretion, however, takes place only during the digestive period.

Although disturbances of digestion associated with an hyperacid gastric juice were vaguely known to the old writers (Pemberton, Copland, and others), it is only in recent years that these forms have been thoroughly studied and placed on an exact scientific basis. Formerly it was thought that in most disturbances of the stomach the gastric secretion was deficient. Nowadays, since the publications of Riegel, Reichmann, Jaworsky, Glusinsky, Ewald, and others, we know that in almost one-half of all the patients suffering with digestive disorders, the gastric juice is rather increased.

According to my own experience, the gastric disorders accompanied with hyperchlorhydria form more than one-half of the number of patients troubled with digestive affections. With reference to this point the

¹ Read before the New York State Medical Association, October 16, 1895.

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589.

following table may be of interest. Among 564 patients whose gastric contents I have analyzed during the years 1889-95, 286 showed a hyperacid state of the gastric juice. In all these patients the degree of acidity one hour after the test-breakfast was above 60, and in more than half of them above 80.

TABLE OF PRIVATE PATIENTS WHOSE GASTRIC CONTENTS
HAVE BEEN ANALYZED DURING 1889-95.

Number of patients with hypo-chlorhydria, 187.	{	in 89 : HCl = 0, acidity = 2 to 40
		in 31 : HCl = 0, acidity = 40 to 80
		in 67 : HCl + , acidity = 15 to 40
Number of patients with eu-chlorhydria, 91.	{	in 91 : HCl + , acidity = 40 to 60
Number of patients with hyperchlorhydria, 286.	{	in 286 : HCl + , acidity = 60 to 140
Total number of patients, 564.		

Whether hyperacidity should be considered as a disease *sui generis* or not, is difficult to decide. Hyperacidity certainly describes only one symptom, showing that the secretory function is increased without pointing to any definite anatomical lesion; but this symptom may be of the greatest importance, and very often covers the whole ground upon which is based the subjective suffering of the patient and the rational treatment at our command. That is the reason why we think it best to discuss hyperchlorhydria as a separate disease.

Does hyperchlorhydria always give rise to digestive disturbances and other symptoms? In order to answer this question it will be best to determine more exactly where hyperchlorhydria begins, *i.e.*, to what degree of acidity we may apply this term. According to the experience of Ewald and others, to which I add my own, the degree of acidity of the gastric contents, about one hour after Ewald's test-breakfast varies, as a rule, in healthy people between 40 and 60. A degree of acidity of 70 and above is therefore con-

sidered as hyperacidity. The above question will now be put in the following way: Must people with an acidity of their gastric contents of 70 and above, always present morbid phenomena? To this I must answer in the negative. From a very large experience I must assert that we occasionally meet with persons whose degree of acidity of the gastric contents is as high as 100, and even more, without producing any disturbance whatever. This condition need not even be a transient one, but may last for years and still cause no discomfort. This, however, is not the rule, and the greater number of persons with an hyperacid juice are not free from disturbances, and rather present a very characteristic train of symptoms. We speak of a pathological hyperchlorhydria whenever this condition is associated with subjective complaints.

Etiology.—Hyperchlorhydria is, as we have just stated, of very frequent occurrence. It is met with chiefly in adults, although neither the young nor the old are exempt. In the majority of cases the origin may be traced to either a psychological cause, such as grief or worry, or to mental overwork. It is, as a rule, more frequent among the wealthier and more educated class of people, as lawyers, bankers, etc., although hyperchlorhydria may be met with also among the poor. But in addition to this so-called reflex action of the brain as an etiological factor of the disease, there may also be direct causes; thus, for instance, the habit of taking highly spiced dishes, much ice-water, and strong alcoholic drinks is liable to produce this trouble.

Symptomatology.—The development of this disorder is usually gradual. The patient at first begins to feel uneasy about two or three hours after dinner. Afterward this uneasy feeling changes into a somewhat painful sensation experienced in the gastric region, and instead of appearing after dinner, it occurs about two hours after each meal. The pain lasts for about an hour or two, or even three, and then disappears. Very

often pyrosis accompanies the pain, and occasionally regurgitation or water-brash takes place. The patients, as a rule, can ease their pain by taking some nourishment, especially one that is rich in albumin; thus the white of an egg, milk, meat is capable of dispersing the pain. It also disappears after the ingestion of some alkali, as Vichy water, or bicarbonate of soda. The appetite is ordinarily not diminished, but frequently rather increased. Thirst is generally enhanced. The bowels in most cases are constipated.

The composition of food is frequently of significance with reference to the character of the pains, which are less intense in people partaking of large quantities of meat and eggs, while they are much more severe in persons living chiefly on vegetable diet.

Besides the attacks of pain, patients affected with hyperchlorhydria very often suffer from severe headache, or attacks of dizziness, which may appear either independently or accompanied by gastric pains. The patients, as a rule, do not lose in weight except in some rare instances, in which a faulty and insufficient diet has been instituted for quite a long time.

Objective Symptoms.—On palpation the gastric region is frequently found tender to pressure, although not actually painful, this tenderness not being limited to one circumscribed spot, but to a larger area covering the greater part of the gastric region. The contours and the size of the stomach are frequently found enlarged, although this condition is by no means characteristic of the affection in question. A splashing sound can be produced after the ingestion of water into the stomach, or after meals, but not in the fasting condition.

On examination of the stomach with a tube in the fasting condition it is found to be empty, or only a few c.c. (5-10) of gastric juice can be obtained. One hour after Ewald's test-breakfast, or two to four hours after Leube-Riegel's test-dinner, the gastric contents

contain an abundance of hydrochloric acid and of the ferments, the acidity being, as a rule, much higher than normally (twice or three times as high). A disk of egg-albumin becomes digested in the filtrate of the contents in a very short time (sometimes in half an hour). The gastric contents obtained three to four hours after the test-dinner show microscopically that the meat has been perfectly digested, while starchy substances are yet either unchanged or very little altered. The filtrate of the gastric contents, either after the test-dinner or after the breakfast, will reveal the presence of either starch or large quantities of erythro-dextrine. The addition of a few drops of Lugol's solution to the filtrate will produce either a blue color or an intense dark red.

The high degree of acidity is most commonly caused by free hydrochloric acid. The difference between the amount of free hydrochloric acid (as determined by Mintz's method) and the total acidity is not great, the figure very frequently being from 10 to 20.

The motor faculty of the stomach is usually not impaired; in a few instances it is rather increased. Thus, two hours after the test-breakfast, or six to seven hours after the test-dinner, the stomach is found to be either empty, or contains but very little food. The salol-test likewise shows salicyluric acid in the urine as early as an hour after the ingestion of the salol.

The degree of acidity of the urine is frequently diminished during the digestive period. This, however, is not always the case, for occasionally the degree of acidity of the urine and of the gastric contents may be found increased at the same time.

Course of the Disease.—At the beginning hyperchlorhydria is most frequently intermittent. The patient may suffer from this affection for several days, weeks, or even months, becoming free from this ailment for periods of time which vary from several weeks to months, or even years. After this interval the trouble recurs, either spontaneously without any apparent cause,

or is evoked by a severe mental shock or worry. Later, the periods of hyperchlorhydria become longer, and at last this condition may become permanent.

Prognosis.—The prognosis in hyperchlorhydria is, as a rule, quite good, except in some cases of a very protracted and severe nature, in which the prognosis regarding the complete disappearance of this condition is bad, although even then there is no danger of a fatal issue.

Diagnosis.—The diagnosis of hyperchlorhydria is made either by the subjective symptoms alone, or in connection with the results of chemical examination of the gastric contents. The subjective symptoms characteristic of hyperchlorhydria are: 1. Pains, appearing constantly about two to three hours after meals. The relief from the pains felt immediately after the ingestion of an alkali, or a little while after the partaking of some food, especially albuminous. 2. Appetite and thirst are either in a healthy condition or increased. 3. No marked cachexia. 4. Constipation.

Although all the symptoms mentioned make the diagnosis of hyperchlorhydria probable, it can be made with certainty only after a repeated examination of the gastric juices. 1. On examination of the stomach in the fasting condition the organ is either found empty, or contains only a few c.c. of juice. 2. One hour after Ewald's test-breakfast the degree of acidity is found highly increased, due to the great amount of free hydrochloric acid.

Differential Diagnosis.—In making the diagnosis of hyperchlorhydria we shall have to exclude all conditions which are liable to give similar symptoms—thus, for instance, gastric ulcer, permanent hypersecretion, and biliary colic. The characteristic symptoms of ulcer are too well known to necessitate their perusal. We shall limit ourselves to the remark that the pains of an ulcer, even if this is accompanied by hyperchlorhydria, do not disappear entirely after the ingestion of

large doses of alkalies. Permanent hypersecretion is very frequently accompanied by vomiting, and the most intense attacks of gastric pain appear, as a rule, in the middle of the night or early in the morning. On examination with the tube, the stomach in the fasting condition is found to contain considerable quantities of gastric juice (80 c.c. to 100). Biliary colic, not accompanied by jaundice nor by considerable palpable swelling of the gall-bladder, may give rise to errors as to the real cause of the pain. In biliary colic, however, the pains, as a rule, appear later than in hyperchlorhydria (four to five hours after a meal), and are not eased by the ingestion of food or by alkalies. Another means of differential diagnosis is, that the pains in biliary colic most commonly extend over the right epigastric and hypochondriac regions, whereas the pains of hyperchlorhydria are felt more in the middle of the epigastrium, although sometimes radiating further to the right.

Treatment: Hygienic Regimen.—As hyperchlorhydria is most frequently caused by too much mental work, the daily life of the patient as to amount of work, bodily exercise, mental rest, and pleasure, will have to be regulated. With regard to this point the same rules will not apply to all, but it will be necessary to individualize each case for itself. Thus, business men with a great deal of responsibility resting upon them, lawyers, politicians, and physicians must be sent away from their work to some country place, so as to relieve their brains temporarily from the strain. Ladies moving in high social circles, and participating in all manners of festivities, will have to be reduced to a more quiet life. Again, there are people with large fortunes and without any occupation whatever, who become sick from paying too much attention to their own bodily functions. Here it will be necessary to occupy the mind of these patients with some kind of work.

Cold sponge-baths in the morning, bodily exercise of

about eight to ten minutes during every morning, are in most instances of value. Walking once or twice a day for half an hour to an hour, horseback riding, driving, bicycle riding, should be highly recommended.

Diet.—All substances that are liable to intensely excite the glands of the stomach must be excluded from the dietary of such patients. Therefore all kinds of acids, including organic acids (citric, tartaric, acetic acid), all kinds of spices, such as pepper, mustard, horse-radish, and the like must be forbidden. The food should consist of nourishments rich in albumin, while the quantity of starchy substances should be diminished. Thus, all kinds of meat (even game), fish, oysters, eggs, milk, should be taken in large quantities. Bread and butter is permitted. Potatoes, spinach, asparagus, green peas, farina, and rice should, as a rule, be given in only small quantities. Cocoa, weak tea, weak coffee, and beer can be given in moderate quantities.

As a rule it is advisable to have the patient partake of five meals daily, three larger and two smaller. The larger meals should not deviate much from the ordinary bill of fare, while the two smaller ones should consist either of a glassful of milk or matzoon, with bread and butter, or a cup of cocoa and a few crackers, or occasionally a cup of bouillon with an egg beaten up in it, and some bread, or half a dozen oysters, a few crackers, and a glass of beer. The patient must be impressed with the importance of masticating the food thoroughly, and eating slowly, besides resting fifteen or twenty minutes after each meal.

Medicaments.—All kinds of alkalies can be applied in the treatment of this affection. Where hyperchlorhydria is not complicated with constipation, bicarbonate of soda may be given, either alone or in combination with sugar of milk or peppermint sugar (German Pharmac.) in doses of half a teaspoonful to about one teaspoonful three times a day, two hours after meals.

In cases which are accompanied by constipation, magnesia usta and some rhubarb can be added, and here I frequently prescribe the following :

- ℞. Magnes. ust.,
 Pulv. rad. rheiãã 7.5
 Natr. carbon. exsicc.,
 Natr. bibarbo.,
 Elaeosacch. menth. pip.ãã 15.0

M. Exactissim, f. pulv.

D. Ad scatulam.

S. : One-half teaspoonful to a teaspoonful three times daily, two hours after meals. To be taken in plain water or in Vichy water.

Bouveret uses sodium bicarbonate in two-gramme doses, to be taken two hours after lunch and supper, and to be repeated after an hour's interval. The alkaline treatment can be continued for very long periods without any ill effects whatever. In cases in which the nervous element is more disturbed (sleeplessness, headaches, over-excitability, etc.), we should give a good dose of a bromide salt. I am in the habit of prescribing strontium bromate :

- ℞. Stront. bromat. puriss 12.0
 Aq. menth. pip. 60.0

D. S. One teaspoonful twice daily in milk, at meal-time.

Sodium bromide and ammonium bromide can be employed in the same way. The bromides should, however, be given only for a week or two, and their use then discontinued for a short time, after which they may be resumed for the same length of time. Boas advises the administration of small doses of morphia or codeine. He frequently prescribes the following :

- ℞. Magnes. ust. 15.0
 Morphii hydrochlorici. 0.1

M. f. pulv. d. in scat.

D. S.—A point of a knife to a teaspoonful three times daily.

I have very seldom seen the necessity of prescribing either morphia or codeine in this affection.

Of the watering-places, Vichy and Neuenahr are to be highly recommended. For the treatment of these patients at home these mineral waters are taken most advantageously in small quantities.

Electricity.—In cases of a protracted nature, the direct application of the electric current to the inside of the stomach is frequently of the greatest benefit. In most instances the faradic current should be applied, but in cases in which the pains are very severe, galvanization should be employed.

As to the mode of application of the current, and the length of time required for this treatment, see my papers on intra-gastric electrization. The electric current applied in this manner exerts a stimulating tonic influence, not only upon the stomach but also upon the small and large intestines. I have frequently seen cases of hyperchlorhydria, accompanied by the most obstinate constipation, perfectly cured by means of the current, even when no medicament whatever has been given.

II. Gastro-succorrhœa Continua Periodica (Reichmann), Gastro-xynsis (Roszbach).—By “gastro-succorrhœa continua periodica” (or “periodic continuous flow of gastric juice”) is designated an affection which is characterized by a constant secretion of gastric juice giving rise to spells of vomiting and severe pains and lasting only several days.

General Remarks.—The affection is met with either in persons suffering from some organic lesion of the peripheral or central nervous system, or in persons whose nerves appear to be in a normal state. The periodic continuous flow of gastric juice was first described by Reichmann;¹ a few years later Roszbach² had described, under the name of gastro-xynsis, a nervous affection of the stomach, which consists in a sudden appearance of severe headaches accompanied by

¹ Reichmann: Berl. klin. Wochenschrift, 1882, N. 40.

² Roszbach: Deutsch. Arch. f. klin. Med., 1885, Bd. 35.

gastric pains, and vomiting of very acid chyme or gastric juice. In accordance with Boas, I consider gastro-xynsis and gastro-succorrhœa continua periodica, as one and the same affection, and I do not think they should be treated under different headings.

Symptomatology.—In the midst of perfect health a sensation of discomfort is experienced in the gastric region, which is associated with restlessness. Soon afterward the discomfort changes into a rather painful sensation, and a feeling of nausea appears. The patient is compelled to occupy a recumbent position. The symptoms just described continue, or rather increase in severity, and in about an hour or two the nausea ends in vomiting of a large quantity of gastric contents. The patient may now feel a little relieved for a short time, but soon the same symptoms return. The appetite is entirely lost, and instead there is extreme thirst. The more the patient drinks, the more, as a rule, he has to vomit. If he abstains from drinking the vomiting is less frequent, but persists nevertheless. Thus, as a rule, in the middle of the night or early in the morning, the patient has to vomit a large quantity of a watery liquid which is very acid in character, and either quite clear or greenish from the admixture of bile. If this liquid be examined, it will be found that free hydrochloric acid is present in large quantities, as well as the ferments (rennet and pepsine). No food particles can be discovered in the fluid. It consists of either clear gastric juice or gastric juice with admixture of a little bile. After such an attack frequently a constant desire to vomit persists, and the patient suffers from very violent and painful retching. Often, a quarter of an hour after the last paroxysm of vomiting, the patient's efforts to vomit cause a small quantity of clear yellow bile to be ejected. Even if the patient absolutely abstains from all kinds of food and drink, a few hours later a large quantity of gastric juice may again be vomited. The patient in this condition is hardly able

to sleep for any length of time, as the pains awake him soon after he has fallen asleep. The abdomen, as a rule, is sunken. The patient looks extremely pale and his extremities are frequently cold. Severe headaches often accompany this train of symptoms, and constipation is almost a constant concomitant. After this condition has lasted for about two or three days, or sometimes even longer, the nauseous feeling begins to disappear, the pains subside, and the patient experiences for the first time a desire for food. He is now able to eat without vomiting, and in a day or two feels himself again. It is characteristic of this affection that the symptoms disappear almost suddenly, and that the patient, who seemed to be in a wretched state a few hours before, may now appear nearly well. After a period of perfect euphoria, varying from several weeks to a few months or a year, or even longer, a similar attack may occur. The attacks may then recur either after the same period of time, or the intermission of health may become gradually shorter, so that at last the patient has hardly recuperated from his last attack before a new one supervenes. The latter condition forms the intermediary stage between periodic and chronic gastro-succorrhœa. During the free intervals the gastric secretion takes place either in a perfectly normal manner, or hyperchlorhydria may exist. In both instances, however, the stomach remains free from secretions in its empty state.

The following case, which I observed recently, may serve as a good illustration of this affection. R. B. I. —, aged thirty-seven, business man. During 1890 and 1891 patient had several attacks of the then prevailing grippe. In December, 1892, after the third attack of the grippe he was taken ill with a stomach trouble, the nature of which patient described as follows: "I was taken suddenly by a fit of vomiting, entirely emptying the stomach apparently, but followed by successive spells, at an interval of one to two hours, accompanied

by the most intense pain. This would last from twenty-four to thirty-six hours, and sometimes forty-eight, after which the stomach would gradually quiet down so that nourishment in the form of milk—either hot milk or kumyss—could be taken in small quantities at intervals of about two hours, until a normal condition was restored, which usually took from two to three days to accomplish.

“The character of the vomit was, first, that of undigested food, followed by a strong and very acid nature of a whitish color, and finally that of a greenish color, consisting principally of bile. After each of the spells mentioned the intense pain would subside, and I would fall to sleep—to be awakened again by a recurrence of the pain—the intervals of sleep and suffering varying from an hour to three as I became better, and continuing until vomiting had ceased.

“During all these spells I was exceedingly nervous—the slightest noise or vibration causing pain and sometimes causing the vomiting. General condition after becoming able to sit up was one of extreme weakness—having lost from ten to twenty pounds, as the attacks were longer or shorter.

“During 1893 I was ill four or five times, in 1894 as often, and in 1895 four times. Weight previous to grippe averaged 135 to 138 pounds; since these attacks it has varied from 125 to 133.”

Present Condition.—July 22, 1895.—Chest organs normal. The palpation of the abdomen does not reveal any pathological condition. The splashing sound can be easily produced in the gastric region, and extends downward to about two fingers' width below the navel. Knee-reflex present. Urine does not contain any sugar or albumin. Besides the above-described attacks of vomiting, patient complains of a feeling of heaviness in his gastric region about one hour after meals, and of slight constipation.

July 23d.—Examination of the gastric contents one

hour after Ewald's test-breakfast: $\text{HCl} + \text{Acidity} = 100$; free $\text{HCl} = 86$.

October 8th.—Patient is in bed suffering from one of the attacks mentioned; he had vomited several times during the day and is suffering from intense pain. On inspection the abdomen is slightly sunken; on palpation the whole gastric region is found extremely sensitive and painful to pressure. The hands and also the face (particularly nose and forehead) are somewhat cold; pulse, 110; temperature, 98° F. The vomited matter consists of a pretty clear fluid with an abundant admixture of mucus; no food particles can be discovered in the liquid. On chemical examination free HCl as well as pepsin and rennet are found present in large amount. Patient complains of intense thirst. Under the administration of opiates the patient grew better and was able to leave his bed after three days.

Diagnosis.—The diagnosis of gastro-succorrhœa continua periodica can be made by the above-described symptoms, in connection with the examination of the vomited matter (which is found to consist principally of clear gastric juice without admixture of much food), or the examination of the stomach in the fasting condition by means of the tube (which results in the withdrawal of a considerable quantity of clear gastric juice). Inasmuch as similar attacks of gastro-succorrhœa may occur as a consequence of either an open ulcer or a cicatrix within the stomach, the pylorus, or the duodenum, it will be necessary to exclude such organic affections before making a diagnosis of continuous periodic gastric flow, which we consider as a nervous affection. It will also be of importance to exclude organic, spinal, or cerebral troubles, which may cause a similar disorder of reflex origin.

Prognosis.—The prognosis of pure cases of gastro-succorrhœa continua periodica is, as a rule, not bad. In many instances, it is possible either to make the at-

tacks less severe, or in some instances to effect a cure by rational treatment.

Treatment.—It will always be advisable to analyze the gastric juice of the patient during the free intervals. If hyperchlorhydria is found, this will have to be treated as such, even if there should be no subjective complaints; for hyperchlorhydria is frequently, although not always, the cause of such attacks. At any rate, a hygienic way of living should be inaugurated by the physician. I am in the habit of prescribing a good-sized dose of bromide, as soon as the patient feels an attack coming on, and find that occasionally it may be cut short from the very beginning. In some instances the attack, although not interrupted in its progress, is thereby rendered less severe. When the attack has appeared the patient must be kept in bed. A hot-water bag is placed over the gastric region, and if the pains are severe an opiate, either alone or in combination with belladonna, is administered. During the first day of the attack no nourishment whatever should be given. A teaspoonful of cold water, or a small ice-pill, can be administered from time to time, especially if the patient is very thirsty and dry. The next day small quantities of milk, matzoon, or egg-water, one or two tablespoonfuls, are given every hour. On the third day the quantity of nourishment may be increased to half a cupful at a time, administered every two hours, and besides the above liquid food, the white of a hard-boiled egg, chopped up fine, may also be given (one or two eggs a day). On the fourth day meat (scraped, raw, or broiled) may be tried, and afterward the diet gradually arranged as for cases of hyperchlorhydria. The system of diet as laid down here for every day from the beginning of the attack will certainly depend upon the condition of the patient, and will have to be modified accordingly. As there is always constipation during the attack, it will be best to move the bowels on the second or third day, either by a glycerin supposi-

tory, or by a large injection of water (a quart of water and a teaspoonful of salt), or an injection of sweet oil (one pint).

III. Gastro-succorrhœa Continua Chronica ("Chronic continuous flow of gastric juice," or "Reichmann's disease").—Under the above name Reichmann,¹ in 1882, described a pathogenic condition which is characterized by a constant secretion of gastric juice, even when there is no food whatever in the stomach. The stomach is found to contain considerable quantities of gastric juice in the morning, even in the fasting condition.

General Remarks.—In describing this new disease, Reichmann, in 1887, mentioned that he had observed sixteen cases. An exact scientific diagnosis had been made, however, only in six of them. "In the remaining cases," says Reichmann, "I was unable to find in the stomach in the morning, in the fasting condition, a large quantity of a liquid containing hydrochloric acid and pepsin, and exhibiting digestive properties, but containing also much peptone and remnants of amylaceous food."

Among the six cases which Reichmann considered as typical of gastro-succorrhœa chronica, I think that only one (Case 3) deserves this name, for the remaining five, aside from the constant secretion of gastric juice, presented other important lesions of the stomach, which in all probability were rather the cause than the effect of the constant gastric flow. In all the cases described by Reichmann (except in Case 3) the stomach in the fasting condition contained a considerable quantity of liquid, consisting of gastric juice, and containing amylaceous food remnants. When the stomach had been washed out on the previous night, and the patient had abstained from food or drink, the stomach in the morning nevertheless contained clear

¹ Reichmann: Berl. klin. Wochenschrift, 1882, N. 40; 1884, N. 48, and 1887, N. 12.

gastric juice. These cases are then undoubtedly cases of dilatation of the stomach, or more correctly speaking, of stenosis of the pylorus, in which hypersecretion must be considered as a concomitant factor. Reichmann, and following him, especially the French writers Bouveret,¹ Debove, and Rémond,² and among the Germans, Riegel,³ have laid too little stress upon the distinction between the constant flow of gastric juice and dilatation of the stomach due to stenosis of the pylorus. On this account the picture given by these authors of the true gastro-succorrhœa chronica bears a closer resemblance in many points to that of dilatation of the stomach, than to the picture of the affection in question. Inasmuch as the treatment of cases of stenosis of the pylorus in most essential points differs from the treatment of cases of gastro-succorrhœa (I need only mention that the most rational treatment for the former is a surgical one), it is absolutely necessary to strictly differentiate between these two conditions.

About two years ago Schreiber,⁴ of Königsberg, published an extensive paper in which he doubted the existence of the new disease, and considered all the cases described by Reichmann as cases of dilatation of the stomach with stagnation of food. Shortly afterward, two other important papers appeared with reference to this question: Riegel⁵ defended Reichmann's views, while Martius⁶ was inclined to favor Schreiber's opinion. Whether Schreiber's view, that the stomach normally secretes gastric juice even while in its empty state, is correct or not, is a question that is quite difficult to decide, although I am personally of the opinion that when there is no food in the stomach there is no secretion. But leaving aside this question about the physiology of the stomach, there is no doubt that, as a

¹ Bouveret: *Traité des Maladies de l'Estomac*.

² Debove et Rémond: *Les Maladies de l'Estomac*.

³ Riegel: *Deutsche med. Wochenschrift*, 1893, N. 31 and 32.

⁴ Schreiber: *Deutsche med. Wochenschrift*, 1893, N. 29 and 30.

⁵ Riegel: *l. c.* ⁶ Martius: *Deutsche med. Wochenschrift*, 1894.

rule, the stomach in the fasting condition does not contain any considerable quantity of gastric juice. Whenever considerable quantities are found, the stomach must be considered as affected. In this respect I agree with Reichmann, as to the existence of a pathological continuous gastric succorrhœa, although I shall restrict this name only to cases not presenting any organic lesions of the stomach. Whenever the latter exist I deem it best to look upon the accompanying gastric succorrhœa as a consequence of the main trouble, but not as a primary affection. According to my experience, which coincides with that of Ewald, cases of genuine gastro-succorrhœa chronica are quite rare. They are less frequent than the gastro-succorrhœa periodica. During the last seven years I have met with six cases of this affection, one of which I¹ published in 1887. Before entering into the discussion of the pathology of this disease, it might be best to briefly describe one of my recently observed typical cases of gastro-succorrhœa.

A. S——, twenty-one years of age, has suffered since early youth from digestive troubles. As far back as he can remember, he has felt hungry very soon after meals (one hour). The bowels, although regular, were occasionally very constipated. Patient was always weakly, but in the last three years had been troubled in a higher degree. He felt extremely weak, became dizzy after meals, and was overcome by a feeling of sleepiness. The bowels became constipated all the time. During the last six or seven months there was a sensation of extreme weakness in the hands and feet. The appetite was constantly increased, and a hungry feeling appeared very frequently. Since three months there had been present a burning sensation in the gastric region, which increased in severity about an hour or two after meals. From that time on, patient began

¹ Max Einhorn: New Yorker Medic. Presse, 1887, and Dietetic Gazette, December, 1889.

to vomit frequently. The vomiting, as a rule, occurred very soon after a meal, although occasionally it took place either in the middle of the night or in the morning before breakfast. Patient had lost lately in weight (about ten pounds).

Present Condition.—Chest organs intact. On palpation, the gastric region is somewhat sensitive to pressure. There is, however, no circumscribed painful area. A splashing sound can be produced, extending to about one finger's width above the navel. Tongue is thickly coated. Color of lips and cheeks quite good, and the patient does not look emaciated. The knee-reflex is present, and the urine does not contain anything abnormal. The examination of the stomach one hour after a test-breakfast, showed the quantity of chyme to be small (about thirty cubic centimetres); hydrochloric acid + ; acidity = 100.

The examination of the stomach in the fasting condition revealed that the organ contained a considerable quantity of pure gastric juice ; 120 c.c. of a somewhat turbid liquid, not containing any food remnants whatever, were withdrawn with the tube. This fluid contained free hydrochloric acid, had an acidity of 80, gave only weak biuret reaction, while erythro-dextrine, dextrine, and sugar were totally absent. During the first three months of treatment the condition of the stomach in reference to its secretion of juice did not change in any way. Repeated examinations which had been made in the fasting condition of the patient always gave the same result: presence of about one hundred cubic centimetres or more of pure gastric juice.

The treatment consisted at first in regulation of the diet and in the administration of large doses of alkalis. Later on, washing of the stomach and spraying of the organ with a 1 to 2 pro mille solution of nitrate of silver was instituted. The latter means proved more effective than the above treatment, and after about two weeks it was noticed that the stomach in the

fasting condition contained considerably smaller quantities of juice. Thus, thirty or twenty cubic centimetres of juice were frequently found. The spraying was continued for two months, after which time the stomach in the fasting condition was usually found empty. This objective improvement was connected with a subjective amelioration of all the symptoms: the vomiting ceased, the hunger was much less marked, the dizziness subsided, and the patient felt stronger and could do his work much better. The examination of the stomach one hour after the test-breakfast, however, showed that the hyperchlorhydria still persisted. In this case we frequently tried to determine the motor (or transportation) faculty of the stomach; one and a half hour after the test-breakfast, as a rule, the stomach was found empty, showing that this faculty was rather increased. This is of interest, inasmuch as it shows that continuous hypersecretion need not be associated with sluggishness in the muscular action of the organ, a theory which is accepted by most investigators who have written on the subject.

Etiology.—Gastro-succorrhœa chronica is met with much more frequently in men than in women. In some instances there is present, besides this affection, some other functional neurotic disturbance. In three of my cases the latter was very marked. Thus one of these patients complained of a burning sensation all over his limbs, which lasted for three months and then suddenly disappeared. Like hyperchlorhydria, the gastro-succorrhœa seems to arise from great mental worry or strain.

Symptomatology.—After a more or less prolonged period of different dyspeptic disturbances, which are similar in character to those caused by hyperchlorhydria, there appears a pronounced sensation of pain several hours after and shortly before meals. Very soon vomiting supervenes as a new symptom. At first it occurs only occasionally, but constantly grows more

frequent, until at last there is either one or several vomiting spells every day. The vomiting appears most frequently soon after breakfast, sometimes also after supper. In only a few cases does it occur at night, about two or three o'clock, preceded by long and severe attacks of pain. The vomited matter is always very acid, and more or less liquid. The night vomit especially consists, as a rule, of a clear liquid containing hardly any food.

The appetite is generally increased, although there are exceptions to this rule. In some cases periods of extreme hunger alternate with periods of severe anorexia. In most cases the sensation of thirst is greatly increased. In all of my cases constipation was marked. In some there was present loss of weight, but none of my patients was emaciated in any great degree.

Diagnosis.—Although the symptoms described might suggest the presence of gastro-succorrhœa in certain cases, the exact diagnosis can be made only by a repeated examination of the stomach in the fasting condition. By inserting the tube into the stomach, and telling the patient to exert some pressure with his abdominal muscles, a more or less large quantity of liquid (60–100 c.c.) is obtained from the stomach. This contains no food particles, but exhibits all the properties of the gastric juice. It may look greenish from the admixture of bile, but this is not an important sign. The filtrate, as a rule, shows a somewhat increased degree of acidity. It never contains any starchy products (absence of erythro dextrine, achroo-dextrine, and sugar). Microscopically no sarcinæ or other signs of decomposition are found. Frequently cell-nuclei are met with in large numbers. In examining the patient one hour after Ewald's test-breakfast the gastric contents will be found to contain more liquid than usually, and the degree of acidity will be quite high (80–100). As a rule, the degree of acidity of the gastric contents is higher than that of the gastric juice when withdrawn

from the stomach in the fasting condition. In examining the filtrate of the gastric contents as regards the starchy products, it will be found that the lugol solution will produce a deep violet or even blue color, showing that the starch has not been much changed. A thin disk of a hard-boiled egg will be digested in the filtrate at blood temperature in about half an hour to an hour. The difference as to the degrees of digestion of the albuminates and starches (the former being quicker, the latter much more slowly digested) can be best studied after Leube-Riegel's test-dinner. Three to four hours after such a dinner, the obtained gastric contents contain hardly any meat particles (all being digested), whereas particles of starchy food form the principal part of the mixture. In this way the difference between the digestion of meats and starchy foods existing in this affection is seen at once.

Differential Diagnosis.—In making the diagnosis of gastro-succorrhœa, all organic lesions of the stomach (ulcer and stenosis of the pylorus) which are liable to be accompanied with gastro-succorrhœa, will have to be excluded. According to my experience, it is easy to exclude stenosis of the pylorus, but not an ulcer. In stenosis of the pylorus the stomach in the fasting condition is also found to contain a liquid, but this is mixed with food ("ischochymia"), and the filtrate always shows the presence of starch or sugar products. But the main thing is that food particles can be seen even with the naked eye, whereas the liquid found in the stomach in case of genuine gastro-succorrhœa does not contain any food particles, as described above. The presence of an ulcer will be suspected if there has been a preceding hæmatemesis or melæna, or a circumscribed spot (in the gastric region) very painful to the slightest pressure. The absence of these symptoms will tend to justify the diagnosis of gastro-succorrhœa.

Prognosis.—According to my experience, the prognosis of gastro-succorrhœa is not bad. As a rule, most

patients improve under rational treatment. Frequently however, there are relapses. Some very obstinate cases are occasionally met with, and the trouble, although yielding somewhat to treatment, may persist for years. There is, however, no danger of a fatal issue resulting from this disease alone.

Treatment.—As we have seen, gastro-succorrhœa is always associated with hyperchlorhydria. The treatment of the latter condition in reference to diet, medicaments, and mode of living, will have to be resorted to here also. With reference to diet, I have only to add that it is of great importance not to permit the patient to partake of any large quantities of liquid. In this affection more stress must be laid upon this point than in hyperchlorhydria. The treatment of gastro-succorrhœa must be directed toward decreasing the undue amount of gastric secretion.

1. Medicaments : With this end in view, Voinovitch¹ recommends the use of atropia in doses of two milligrammes daily. Bouveret prefers morphia to atropia. Following the advice of Leubuscher and Schaeffer,² he administered two to three centigrammes of sulphate of morphia three times daily, in subcutaneous injections. This author doubts, however, whether this treatment, which seems to be effective in the initial state of the affection, will prove useful in cases that have progressed further. The use of either atropia or morphia may be tried for a short time, but they should never be administered for a long period. The subcutaneous injections of morphia especially should be avoided, as the patient runs the risk of becoming an habitué of this drug.

2. Lavage : Reichmann, and latter Riegel, recommend the use of lavage of the stomach as the best means of improving its condition. While Riegel washes out the stomach in the evening, six to seven hours after

¹ Voinovitch : Semaine médicale, April 6, 1892.

² Leubuscher and Schaeffer : Deutsche med. Wochenschr., 1892.

the last meal, Reichmann and most writers administer the lavage in the fasting condition. The latter way is also employed by myself ; it has the following advantages :

a. That by emptying the stomach in the fasting condition we are better enabled to judge the quantity of juice present at a time when normally there should be none.

b. That no food whatever is removed from the stomach.

Instead of lavage Boas recommends emptying the stomach by means of a tube in the fasting condition (expression method). In order to more effectually combat the undue secretion, Reichmann recommends adding nitrate of silver to the water used in washing out the stomach. After it has been washed out with plain water, 300 c.c. of a 1 to 2 per 1,000 solution of nitrate of silver are poured into the organ, and left there for about five minutes, when it is withdrawn by siphonage.

3. Spraying the stomach : Instead of the latter proceeding I have sprayed out the stomach after the washing with a 1 to 2 per 1,000 nitrate of silver solution. In two cases I found this method of treatment of great benefit.

4. Direct galvanization of the stomach : The first of my observed cases of gastro-succorrhœa chronica was a very obstinate one, and the affection did not yield much to the medicinal treatment or to the use of lavage. I empirically tried direct galvanization of the organ, and after a treatment of a few weeks the stomach began to be empty in the morning, and has remained so for several years. Since then it has been my custom to make use of this method in this affection, and I must say that the result has been very gratifying. Very often I employ both spraying with nitrate of silver and direct galvanization, applying them alternately.

